Appendices

SECTION 7: CORRECTIVE ACTION PLAN (CAP)

7.1 INTRODUCTION

The department may require persons taking corrective action at a LUST site to submit a CAP. The CAP is a comprehensive approach proposed to mitigate the effects of a release of regulated substances from a UST system in a site-specific, technically feasible, and cost-effective manner. This guidance provides a discussion of the information that should be considered, and documentation that should be submitted, by those parties preparing a CAP.

In the context of this guidance, a CAP presents information regarding the use of remedial alternatives to address site-specific contamination by application of tools and methodologies which achieve generic or site-specifically determined risk-based cleanup goals and other criteria as presented in this section. Therefore, a remedial alternative is a **set** of tools and methodologies which, when applied in a specified combination, achieves this endpoint. A CAP is **NOT** a document presenting information on the use of independent, stand-alone technologies or tools. Rarely will the remedial alternative which best addresses site contamination in a reasonable, technically feasible, and cost-effective manner consist of a single tool or technology. The simplest way to remember this is represented below:

1 Remediation Technology ... 1 Remedial Alternative

The complexity of site investigation and corrective actions depends, in part, on the type and extent of liquid, dissolved, and adsorbed phase contaminant(s). The department will review the proposed CAP and will provide a response regarding the adequacy of the CAP toward achieving the following objectives:

a. Protection of human health and the environment.
b. Technical feasibility.
c. Cost-effectiveness.

The CAP not only provides detail for the department to review remedial alternatives and approve an appropriately selected alternative for a site, but also provides a forum for public information, review and comment. Therefore, these CAP guidelines have been developed to comply with A.A.C. R18-12-263.02. As part of the approval process, the ADEQ is required to provide public notice and an opportunity for public comment for each CAP. If sufficient public interest is shown or for any other reason the ADEQ considers appropriate, the ADEQ will hold a public meeting to address

comments concerning the proposed CAP.

A CAP in this context is not a plan to evaluate one or more methodologies for free product removal and/or abatement. The investigation, removal and abatement of free product is discussed in Section 3.9 of this guidance, should be conducted in accordance with site-specific conditions, and reported using the Free Product Report Form included in Appendix C.

7.2 SUBMISSION OF A CAP

The department may require an owner or operator, or the owner or operator may volunteer, to develop and submit a CAP to the department that meets the requirements discussed in this section at any time after submission of the initial site characterization report (see Section 5 regarding conditions which require or may require CAP submittal).

However, the department strongly recommends that site characterization be completed, and that the site characterization report (SCR) be submitted to and approved by the department prior to CAP development and submittal. The department recognizes that conditions may arise which prevent or extend the completion of full site characterization. Under these circumstances, an owner or operator may request the department to approve the initiation of CAP development. The department will approve the request for, or require that the owner or operator proceed with, a CAP when the department determines that adequate site-specific information has been developed to define site contamination, and to complete a CAP which adequately addresses contamination at the site and fulfill the requirements of A.R.S. § 49-1005(D).

After receipt of the department's written request, the CAP must be developed and submitted within 120 calendar days, or other period of time established by the department [A.A.C. R18-12-263(D)].

7.3 CONTENTS OF A CAP

When a corrective action plan (CAP) is required or requested by the department, or is voluntarily submitted to the department, an owner or operator shall prepare a CAP using the format provided by the department (see Appendix J) and containing the information prescribed under A.A.C. R18-12-263.02(A) and (B).

This section provides guidance on the information that should be presented to meet the minimum requirements of a CAP when a SCR has been submitted to and approved by the department. In those instances where an SCR has not been approved, the contents of the CAP should be developed to the maximum extent possible. CAPs for these sites should also identify data gaps and and information deficiencies which preclude further evaluation of remedial alternatives.

7.3.1 Document Submittal Form

This form is required to be submitted with all documents and notification submittals to the department. Please refer to Appendix C for this single page form.

7.3.2 Introduction

The introduction should consist of an opening statement, and a description of the goals and expected results which will be met by the remedial alternatives evaluated in the CAP. This latter element may take the form of an executive summary of the CAP report. The introduction, along with the site history, provides the public with the necessary site background for review and comment on the CAP.

The opening statement of the introduction states the regulatory purpose for preparation and submittal of the CAP. It should make reference to the CAP as (i) the response to a release of a regulated substance from an UST system, and (ii) pursuant to A.R.S. § 49-1005(F)(7) and A.A.C. R18-12-263.

7.3.3 Site Background and History

This section of the CAP should consist of a summary of the extent of contamination known at the time of CAP submittal, a summary of the conclusions inferred from the approved site characterization report [(SCR) report itself included as an attachment if not previously submitted], a current LUST site classification form, and a description of any remedial corrective actions initiated as of the time of the CAP submittal.

The summary of the extent of contamination briefly describes the source and type of release, regulated substance released, initial abatement actions, free product recovery actions, and investigations of soil and groundwater contamination. References to appropriate maps, tables and figures from the approved SCR (provided in the CAP appendix) should be provided to support the summary. Additional tables, figures or maps may also be attached in the CAP appendix if not provided in the approved SCR.

A revised conceptual site model (CSM) should be provided with this section of the CAP if any further site-specific information has been developed which alters the CSM as submitted in the approved SCR.

7.3.4 Water Use Survey

When a Tier 2 or Tier 3 evaluation is used for proposing a site-specific corrective action standard for either surface water or groundwater, a determination of the reasonably foreseeable current and future uses, and maximum beneficial use(s) of water must be made. This determination shall be inclusive of the existing and potential uses within 1/4 mile of the outermost boundaries of the contaminated water.

To determine these uses of groundwater and surface water, the owner or operator shall conduct a survey of property owners and other persons using, or having rights to use, water within 1/4 mile of the outermost extent of contaminated water. The survey should request that information identified in the form provided in Appendix N of this guidance. The department recommends that the survey be conducted by mail. The survey should consist of a good faith explanation of the site-specific scope and purpose for the survey, a place for a response to be provided, and contact information should the responder need further information. The form should be a single page, be easy to understand, and pre-printed with a return mailing address upon folding which is suitable for mailing via regular U.S. mail.

An alternative survey method may be conducted, provided that the survey accomplishes a comparable level of due diligence and is conducted in a manner that is more cost-effective. Door-to-door or telephone surveys are not necessary. However, telephone inquiries may be more practical for contacting a few individuals located in remote or long-distance areas. Also, site visits may be practical for contacting a few individuals when done concurrently with conducting field activities at the site. Follow up surveys of non-responsive parties are not necessary.

The results of the survey should be provided in the CAP in tabular form and should include the following information (see Appendix N for survey summary table):

1. Identity of person surveyed as legal owner of “property” or “water rights”;
2. Name of surveyed person;
3. Mailing address of surveyed person;
4. Address of the parcel of real property or a legal description of the; geographic area of water rights giving rise to the survey;
5. Notation of response to the survey as “survey response received” or “no survey response received”; and
6. Categorical identification of the type of water use(s) per ADWR designations.

Copies of survey forms which are returned through mail, or completed by the surveyor by telephone or onsite interview, should be included in the CAP appendix.

This section of the CAP should also include the following survey process information:

1. A map depicting the extent of the survey area
2. A description of the due diligence methodology and sources of information utilized to identify those persons owning property, or using or having rights to use water within the boundaries of the survey area.
3. Date(s) that the surveys were relinquished to an agent of the U.S. Postal Service.

7.3.5 Corrective Action Standard

The corrective action standard, or target cleanup level, for each COC in each medium affected should be determined and clearly stated in the CAP so that each remedial alternative may be evaluated relative to its ability to meet these target cleanup levels. The target cleanup level for any given COC in a single medium may differ among the potential remedial alternatives, and is dependent upon the remedial technologies and risk management tools utilized in conjunction with a Tier 1, Tier 2 or Tier 3 evaluation.

This section of the CAP should include a table identifying for each COC, the corrective action standard proposed, the tier level which determined the corrective action standard (i.e., Tier 1, Tier 2 or Tier 3), the media of concern, and the point of compliance, and the remedial alternative which is intended to achieve this corrective action standard.

The tier evaluation form(s) and document(s) should be included in the CAP appendix.

7.3.6 Remedial Alternatives

This section of the CAP should consist of a site-specific analysis of three remedial alternatives. Each remedial alternative must account for all environmental media of concern. **A remedial alternative may, if appropriate, consist of a single remediation technology, OR may consist of concurrent or sequential uses of one or more remediation technologies, administrative actions, and risk management tools.** For example, a **single** remedial alternative may **initially** utilize air sparge/soil vapor extraction on-site with monitored natural attenuation off-site until specified interim remediation goals/conditions for soil source removal and groundwater contaminant mass reduction are attained. Once air sparge/soil vapor extraction achieves the on-site interim remedial goals, this remedial alternative may then rely on the use of monitored natural attenuation to achieve the site-specific corrective action standards both on-site and off-site. This example of a single remedial alternative uses one remediation technology for off-site contaminated groundwater, and uses three remediation technologies on-site. Assumptions, supporting information, and an analysis of key factors important to each remedial alternative should be provided so that a single alternative may be selected for implementation at the site. A remedial alternative should not be proposed or evaluated if it can not address a COC determined to be present in environmental media. The following information should be provided in this section of the CAP for each remedial alternative:

7.3.6.1 Permits

The purpose of this section is to identify the need for and the type of permit or contractual document which is required for implementation of any technology or risk management tool for a remedial alternative. This includes permits that are required for the installation, operation or maintenance of a technology, agreements of access rights (see Section 4.2), and DEURs (see Section 6).

Permits may be required from the appropriate federal, state, county or local regulatory authority. Permits which may be obtained from the issuing federal agency include National Pollution Discharge Elimination System (NPDES) permits for wastewater discharges, and Underground Injection Control (UIC) permits or form submittals for injecting into or above any underground source of drinking water. Types of UIC applications which commonly occur for UST corrective actions are Class V Aquifer Remediation Wells (ARW). Some examples of these wells are those installed and operated for technologies such as air sparge, pump and treat re-injection, *in situ* chemical oxidation, bioventing, bioaugmentation, bioremediation and biostimulation.

Refer to the EPA Region IX Office of Groundwater and Drinking Water UIC Program or NPDES Program until such time that the state has been granted primacy for regulatory authority. Further information on UIC is available in EPA document, *The Class V Underground Injection Control Study: Volume 16 Aquifer Remediation Wells, September 1999.*

State issued permits may include permits for air quality. Please contact the ADEQ Air Quality Division Permits Section for further information.

Local permits typically include those for fire, electrical, mechanical, building, encroachment, architectural, and sanitary sewer discharges.

7.3.6.2 Conceptual design, operation, implementation and goals

Describe, in narrative form, the objective to be achieved by the remedial technologies and risk-management tools employed in the three remedial alternatives presented. To the extent that is applicable, provide a description of the conceptual design and operation of chemical, physical, biological and mechanical process-oriented systems. For each technology and tool employed for a given remedial alternative, provide a narrative description of tasks important to and in the order of implementation . Refer to Appendix K for an example summary form. These tasks or activities may include concise and brief descriptions of the following components when appropriate or applicable:

- general engineering schematic;
- acquisition and use of specialized equipment/materials;
- specialized subcontractors;
- on-site and off-site property access agreements;
- execution of restrictive covenants for the site or adjacent properties;
- identification of all necessary federal, state, and local permits;
- installation and initial sampling of additional monitoring points;
- installation of remedial systems;
- remedial system start-up and shake down procedures;
- acquisition of baseline operational performance data;
- fate and transport modeling in the subsurface and suface;
- acquisition of modeling calibration and verification data;
- submittal of periodic status report;
- implementation of contingency effluent treatment plans;
- implementation of confirmation sampling or monitoring plan; and
- submittal of the corrective action completion report.

When applicable to a remediation technology or risk management tool, a

discussion should be provided identifying the short-term performance goals and intermediate- term performance goals which may be achieved for the site-specific contaminant type and distribution.

When applicable, the potential impacts of pre-existing or off-site contamination on the use or efficiency of a remediation technology should be discussed . This also applies to discussions of pre-existing potential health risk due to contaminants not present from the subject release. A specific analysis or calculation of the magnitude of decreased system efficacy or incremental increase to health risk is not needed in this section.

This section should also include a brief discussion of the data needs for the basic design and operation of each process-oriented system. This may include rates of degradation or removal which are measured or assumed. If assumed, include a citation for the supporting information reference. The locations of system components should be depicted on a site plan. In some instances, a single site plan may be used to depict the system design/layout for all three remedial alternatives.

Remedial tools which may also be applicable for use in a remedial alternative include the risk-based Tier 2 and Tier 3 evaluations. A Tier 2 or 3 evaluation may establish alternative points of compliance and cleanup standards such that one of the following benefits may result:

1. No additional remediation technologies need to be employed within a remedial alternative.
2. A remediation technology must be used in conjunction with the tier evaluation which is not a component of any other proposed remedial alternative.
3. A remediation technology must be used in conjunction with the tier evaluation which is a component of another proposed remedial alternative. However, the duration and/or costs associated with the conjunctive technology is limited relative to the use of the technology in another proposed remedial alternative.

When relying upon a Tier 2 or 3 evaluation to distinguish between remedial alternatives, sufficient information should be presented in this section which would provide a screening level tier evaluation, or provide a technical foundation for establishing the comparative differences referred to in A.A.C R18-12-263.01(A) for site-specific application. Specifically, an estimate of the order of magnitude of change in cleanup level for COCs, overestimation of risk of the prior tier evaluation, or the magnitude of change in level of effort or time

of implementation of additional remediation technologies to be concomitantly applied. This allows risk-based tier evaluations to be treated similarly to any other remediation technology for consideration in a CAP remedial alternative.

7.3.6.3 Periodic Monitoring, Sampling and Reporting

A description of the monitoring and sampling plan associated with each remedial alternative should be provided unless each remedial alternative relies upon the same plan. If the latter is the case, details of this plan should be presented in the section of the CAP presenting the selected remedial alternative. Otherwise, a brief discussion of the number and frequency of sampling events, the number of samples collected at each event, and the number and types of analyses to be conducted should be provided in this section. The purpose of this discussion is to present relative differences in the monitoring and sampling requirements between remedial alternatives which are key to following the progress of the remediation technology and compliance with cleanup goals.

7.3.6.4 Schedule

In general, the schedule should depict the time frames for each task associated with a remedial alternative. It should encompass the key components required for the various phases of each remedial alternative. The schedule should clearly identify the time period necessary to conduct each task, and an overall cumulative time period for completion of the remedial alternative.

The schedule may be presented in a table or Gantt chart format such that relative time requirements for remedial alternative may be easily reviewed. It is not necessary to include within the schedule the estimated time periods for the tasks of remedial goal confirmation sampling and submittal of the Corrective Action Completion Report. Refer to the example schedule in Appendix K of this guidance.

7.3.6.5 Costs

This section should provide a narrative summary of cost estimates for each remedial alternative's employed remedial technologies and risk management tools. Costs should include all applicable , key tasks and assumptions identified in prior sections discussed for CAP contents. These cost estimates should be based on professional experience and application of remediation technologies and tools. Cost estimates should also be adjusted for site-specific conditions, and contaminant distribution and mass, which may

influence the range of costs reported in widely used peer-reviewed scientific publications.

Refer to the example cost estimate sheet provided in Appendix K of this guidance. This sheet may be used to establish a comparative basis of cost differences between the three remedial alternatives presented in the CAP.

7.3.6.6 Additional Information

Additional information not presented as part of one of the CAP sections discussed above may be presented in this section of the CAP. The purpose of this additional information is to demonstrate the site-specific conditions contributing to the technical feasibility, cost-effectiveness, or ease of implementability or administration of a remedial alternative.

For example, evidence exists that an identified or unidentified off-site source of contamination has contributed to a release. An owner or operator has the right, pursuant to A.R.S. § 49-1016(G), to limit corrective action liability. Under these circumstances, additional information regarding off-site contamination contributing to the comingled plume should be addressed in the CAP. This should include information on the location and identity, when possible, of the known and unknown off-site source(s), alternative proposed corrective action standards and remedial goals based on owner/operator LUST release source contribution, and evidence supporting the determination of the extent and distribution of the owner/operator's portion of the comingled plume.

7.3.7 Remedial Alternative Selection

Obviously, remediation is necessary when one or more contaminants are present in environmental media at levels which are not adequately protective of human health, safety and the environment. Therefore, this section should present an evaluation of each remedial alternative so that a clear justification can be made for the selection of a single alternative for addressing all COCs in all affected media at the LUST site in achieving this goal. The evaluation should demonstrate the extent to which each remedial alternative is reasonable, necessary, technically feasible and cost-effective pursuant to A.R.S. § 49-1005(D). A remedial alternative can be selected when the combination of proposed remediation technologies and risk management tools best meets these criteria.

Information and conclusions drawn from pilot testing and feasibility studies should be provided, if appropriate, as justification for the selection of a remedial alternative. As used in this guidance, a feasibility study differs from a pilot study in that the certainty of success of the technology is more fully understood in the case of the latter. Pilot studies are typically conducted for a remediation technology to define the engineering parameters of system design and operation needed to accomodate site-specific conditions prior to full scale implementation. For example, a pilot study on an SVE system may indicate that the zone of influence around wells is greater than initially estimated, thus resulting in an increased distance between well locations and fewer well installations. Feasibility studies for LUST sites, on the other hand, are not to be confused with formal feasibility studies conducted in conjunction with a remedial investigation for Superfund sites. Rather, feasibility studies typically appropriate for LUST site corrective actions are limited to the further evaluation of a remediation technology or risk management tool which in theory is technically or legally feasible, but may not be possible to implement due to on-site or off-site conditions that significantly influence the process. The results of the feasibility study will determine whether the technology or tool of interest is rendered inapplicable to the site, or less useful relative to another remedial alternative. The purpose of the pilot test or feasibilty study should be clearly stated, and demonstrated as necessary toward evaluating site-specific applicability of the alternative in achieving one or more of the criteria of A.R.S. § 49-1005(D). The following conditions warrant the use of a pilot test or feasibility study:

- basic engineering design for a technology which is reasonable, technically feasible, and cost-effective;
- confirmation of the site-specific technical feasibility for a technology which is reasonable and cost-effective;
- calculation of a more precise estimate of volume of contaminated media or contaminant mass when utilizing technologies which are substantially cost-

sensitive or time-dependent on this parameter (*e.g*., excavation with ex-site treatment/disposal); and

- cost-effectiveness of a non-presumptive technology in comparison to the cost of a presumptive technology, *e.g.*, excavation with *ex-situ* treatment/disposal, or soil vapor extraction.

In comparing the relative ability among remedial alternatives to attain the regulatory cleanup goals, an estimate of the baseline contaminant volume and contaminant mass is needed. These calculations should be provided in this section of the CAP, along with the assumptions, qualifications or limitations used in this determination. When determining the estimated volume of contaminated soil or mass of contamination in soils exceeding remedial standards, consideration should be given to the amount and concentration of separate or sorbed phase contamination within the vadose zone and the volumetric extent of the vadose zone. When determining the estimated volume of contaminated groundwater or mass of contamination in groundwater exceeding remedial standards, consideration should be given to the amount and concentration of separate or sorbed phase contamination below the water table, and the volume and concentration of dissolved phase contamination in the saturated zone. Determination of the estimated mass of contamination found within the capillary fringe aids assessing the costs and schedule for groundwater remedial technologies. Therefore, information from the levels of contamination present in the dissolved phase in the saturated zone, and in the adsorbed phase of the vadose zone, may be utilized in estimating this additional contaminant mass if the thickness of the capillary zone can be estimated coincident to installation of monitor wells.

For the selected remedial alternative, short-term performance goals and intermediate-term performance goals should be stated for the site-specific contaminant type and distribution. These performance goals will be used to assess the actual performance of a remedial system and/ or efficiency of the implemented remediation technology. When applicable, performance goals should be specified for monitoring locations at specified time frames. For systems which can measure the level of contaminant remaining, performance goals should be specified in terms of concentrations not to exceed. Performance goals should not be specified for COC concentrations which are achieved under optimal system performance, but rather, those concentrations which may be achieved by the system or technology operating under site-specific conditions.

When pre-existing or off-site contamination impacts the performance of the remediation technology, the extent which system is affected should be assessed. Information known on the location, quantity, type, sources of, and degree of contaminant contribution should be provided and evaluated with respect to impacts upon the remedial system performance goals. For example, certain types or levels of pre-existing contamination within a zone of the groundwater contaminant plume may

be too toxic to allow the biodegradative process to occur. Therefore, the time period to achieve the AWQS at the point of compliance using natural attenuation is extended unless the toxic zone is treated.

This section should also include a detailed discussion of the data necessary for the basic design and operation of each process-oriented system employed by the selected remedial alternative. Supporting data may include information and conclusions obtained through feasibility studies or pilot tests, *e.g.*, the number, location and cone of influence of SVE wells, groundwater extraction and sparge points; or rates of biodegradation. The locations of system components should be depicted on a site plan.

For remedial alternatives which include a risk-based site-specific tier evaluation, documentation should include the appropriate tier evaluation form for all tiers completed, the completed screening level tier evaluation (if a full tier evaluation is not completed at time of CAP submittal), and the full tier evaluation(s) for the subsequent proposed tier level which establishes an alternative cleanup standard or point of compliance. If a full tier evaluation was submitted and approved prior to CAP submittal, attach a copy of the approved tier evaluation(s) in the CAP appendix.

The periodic monitoring and sampling plan should be provided in this section. It should be designed such that the relative progress of the remedial system can be tracked, and a quantitative assessment made for changes in levels of COCs. Therefore, the plan should reflect site-specific conditions, contaminant plume distribution, COC levels, potential receptor exposure point locations, and other site-specific factors as necessary. For liquid and dissolved phase contamination sites, periodic sampling of the groundwater is required. If the selected remedial alternative includes soil vapor extraction, air sparging, or other remediation technology that causes a discharge of vapors (air or water), periodic influent and effluent sampling is required. If the selected remedial alternative includes the injection, foaming or aerosolization of any regulated substance into the subsurface or onto the surface, periodic sampling at appropriate monitoring locations is required. The monitoring and sampling plan should discuss the following, as appropriate:

- media to be sampled
- monitoring and sampling locations
- field measurements and parameters
- sampling and measurement protocols and procedures
- laboratory analyses to be conducted
- initiation, frequency, and duration of monitoring and sampling events

The results of the periodic monitoring program conducted and conclusions based upon

these results should be submitted in conjunction with the periodic corrective action status report. These reports should include interpretation of reported data including written and graphical analyses, as appropriate [A.A.C. R18-263.02 (B)] so that remedial progress toward short-term and long-term performance measures can be documented.

A detail of the schedule for remedial alternative implementation and completion should be presented. The schedule should depict the time frames for each task associated with the remedial alternative, and should encompass the phases of installation, start up, operation, and demobilization for each remediation technology; implementation periods of risk management tools, and the submission dates of periodic reports. The schedule should clearly identify or describe each task, the time period necessary to conduct each task, and an overall cumulative time period for completion of the remedial alternative. To the extent possible, this schedule should reflect the anticipated disruptions or delays in critical activities or steps of implementation.

At a minimum, the schedule, beginning with final CAP approval, should show the time frames and milestone dates, if possible, for the following elements, as applicable:

- Final engineering design;
- Procurement of on-site and off-site access agreements, permits, and DEURs;
- Installation of additional monitoring points;
- Initial sampling of monitoring points;
- Acquisition of additional modeling data;
- Refinement of health risk assessment components, *i.e.*, exposure assessment, toxicity assessment, risk characterization;
- Remediation system installation;
- Remediation system start-up;
- Preparation and submittal of first and subsequent periodic status reports;
- Periodic monitoring events; and
- Subsequent reports other than periodic status reports.

The schedule may be presented in a table or Gantt chart format. It is not necessary to include within the schedule the estimated time periods for the tasks of remedial goal confirmation sampling and submittal of the Corrective Action Completion Report. This is due to the difficulty in determining precise time periods for attainment of corrective action standards.

A detailed cost estimate for each remediation technology and risk management tool should be provided for the selected remedial alternative. Costs should include all

applicable substantive activities, subactivities, and assumptions (see example cost sheet in Appendix K). These estimates should be made as accurately as possible. Costs for related subactivities for a particular activity may be presented as lump sum, *e.g.*, time, materials, travel, subcontracts and fees for periodic waste disposal. Examples of substantive activities which should have cost estimates provided, and apply to multiple remedial technologies and risk management tools are:

- pilot testing or feasibility studies
- final engineering design
- property access agreements
- permits and DEURs
- installation of remedial systems
- installation of additional monitoring points
- start up and first month operation and maintenance (O&M)
- CAP periodic status reports
- monthly and cumulative O&M (inclusive of scheduled and unscheduled site visits, equipment lease, utilities, effluent treatment or waste disposal, sampling and reporting per permit requirements
- periodic monitoring for progress toward achieving remedial cleanup goals
- confirmation sampling and reporting
- decommissioning and abandonment

In conclusion, the justification of the remedial alternative chosen for the contamination at and from the LUST site must be made upon consideration of site-specific conditions, information and data collected to support a comparative evaluation of the remedial alternatives. The remedial alternative selected must meet the remedial critieria listed in A.R.S. § 49-1005(D) and site-specific corrective action standards. The rationale presented should include references to industry standards of practice that were relied upon. These standards may include technical guidance documents, professional scientific peer-reviewed publications, and vendor literature.

7.3.8 Attachments and Appendices

The CAP appendix should consist of the department approved SCR, any feasibility study/pilot test reports, any tier evaluation reports, copies of completed water use survey forms.

The following maps, tables, figures should be attached when not present as part of one or more of the reports required to be submitted with the CAP in the CAP appendix:

- site plan(s) showing remedial methodology design, including basic components of system, overlayed contaminant plumes, and expected zone of influence for each system component addressing a portion the contaminant plume;
- remedial methodology design figure(s) provided by manufacturer;
- well construction schematic;
- site location map showing properties surveyed for water use;
- site location map showing location of water rights area of water providers;
- property and water provider use survey summary table;
- remedial alternative cost comparison table;
- remedial alternative corrective action implementation schedule; and
- most recent site classification form.

7.4 CAP REVIEW AND APPROVAL PROCESS

The department shall determine if the proposed CAP adequately leads to the protection of public health and the environment through analysis of the following factors [A.A.C. R18-12-263.02(A)]:

- The physical and chemical characteristics of the chemical of concern, including toxicity, persistence, and potential for migration.
- The hydrologic and geologic characteristics of the facility and the surrounding area.
- The proximity, quality, and current and reasonably foreseeable future uses of groundwater and surface water.
- The potential effects of residual contamination on groundwater and surface water.
- The risk characterization for current and potential receptors.
- Any information assembled in compliance with R18-12-251 through R18-12-263.03.

The ADEQ will also review the CAP to determine technical feasibility and cost-effectiveness, and to ensure that it contains sufficient information for the public comment process.

An owner or operator may, in the interest of minimizing environmental contamination and promoting more effective remediation, begin implementation of the remediation technologies before a CAP is approved by the department, if the owner or operator [A.A.C. R18-12-263.02(E)]:

- Informs the department of the intention to begin remediation in writing before implementation;
- Complies with any conditions imposed by the department consistent with the six factors listed above, including halting any activity or mitigating adverse consequences from implementation; and
- Obtains all necessary permits and approvals to conduct the activities.

7.4.1 Modifications

The owner or operator shall modify the CAP if the department informs the owner or operator that modification of the corrective action plan is required. The owner or operator shall, within 45 calendar days after receiving the written notice, or as approved by the department, submit to the department a response to the modification request. The department shall disapprove the CAP if the deficiencies remain after the expiration of the modification submission period, and notify the owner or operator in writing [A.A.C. R18-12-263.02(C)]. It is the intent of the department to work with the person taking the corrective action to achieve cost-effective site clean up.

The process described above does not apply to those CAPs which have been approved by the department and, due to site-specific conditions, warrant submittal of modifications to the CAP.

7.4.2 Preliminary Corrective Action Plan Approval

If the CAP requirements are met, the department must inform the owner or operator in writing that the CAP is complete and must proceed with public notice [see Section 7.4.3 and A.A.C. R18-12-263.02(D)].

7.4.3 Public Participation

The department shall provide a minimum of 30 calendar days notice to the public regarding the public comment period for a CAP submitted to the department. The methods of public notice shall be by a means designed to reach those members of the public directly affected by the release and the planned corrective action. The methods of public notice may include, but are not limited to, publication in a newspaper of general circulation, posting at the facility, mailing a notice to owners of property affected or potentially affected by contamination from the release and corrective actions, or posting on the department's internet site [A.A.C. R18-264.01(A)]. If a CAP includes a corrective action standard for water determined under a Tier 2 or Tier 3 evaluation, a copy of the notice shall be sent to the ADWR, the county and any city government within whose jurisdiction the CAP will be implemented, and local water service providers and persons having water rights who may be impacted by the release [A.A.C. R18-263.02 (H)]. It is the responsibility of the department, not the owner or operator, to issue the public notice.

Public notice contents

A notice to the public shall include all of the following [A.A.C. R18-264.01(B)]:

- A statement that a CAP has been submitted to the department and is available for public comment.
- Identification of the facility where the release occurred and the site of the proposed corrective action.
- The date the CAP was submitted to the department and name of the person submitting the document.
- A specific explanation if a corrective action standard for water, determined under a Tier 2 or Tier 3 evaluation, is part of the document.
- A statement that a copy of the document can be viewed by the public in at least 2 locations including the department's Phoenix office and at a public library located nearest to the LUST site.
- A statement that any comments on the document shall be sent to the UST Program of the department within the time frame specified in the notice.
- A description of the public meeting provisions.

Public meeting

If there is sufficient public interest, before approving a CAP, the department may hold a public meeting to receive comments on a CAP undergoing public review. If the department holds a public meeting, the department shall schedule

the meeting and notify the public of the meeting time and location [A.A.C. R18-264.01(C)].

7.4.4 Modification Due To Public Comment

The owner or operator shall modify the CAP if the department informs the owner or operator that modification of the CAP is required due to public comment received from public notice or meeting. An owner or operator shall respond to the modification request within 45 calendar days after receiving the written notice. If the requested modifications are not made within the 45 day period, the department must disapprove the CAP and notify the owner or operator in writing [A.A.C. R18-263.02(F)].

7.4.5 Final CAP Approval

The department shall approve a CAP only if all of the following conditions are met [A.A.C. R18-12-263.02(G)]:

- The CAP contains all of the required information or the department makes a determination that it has enough information to make an informed decision to approve the CAP.
- The CAP demonstrates the corrective actions that are a subject of the CAP are necessary, reasonable, cost-effective, and technically feasible and meets the requirements of A.R.S. § 49-1005.

The department shall notify the owner or operator in writing that it is approving or disapproving the CAP as follows [A.A.C.R18-263.02(H)]:

- If the department determines the approval conditions are satisfied, the department must approve the CAP and notify the owner or operator. If the approved CAP includes a corrective action standard for water determined under a Tier 2 or Tier 3 evaluation, a copy of the notice must be sent to the ADWR, the county and any city government within whose jurisdiction the CAP will be implemented, and local water service providers and persons having water rights who may be impacted by the release. The notice must also be sent to any persons submitting written or oral comments on the proposed CAP. The notice must include the following:
  a. Any conditions upon which the approval is based.
  b. An explanation of the process for resolving disagreements over the determination under A.R.S. § 49-1091.
- If the department determines the approval conditions are not satisfied, the department will disapprove the CAP and notify the owner or operator in writing of the disapproval. The department will send the notice to any persons submitting written or oral comments on the proposed CAP. The notice will include the following:
  a. An explanation of the rationale for the disapproval.
  b. An explanation of the process for resolving disagreements over the determination under A.R.S. § 49-1091.

7.5 CORRECTIVE ACTION PLAN IMPLEMENTATION

If the CAP is approved, the owner or operator shall begin implementation of the CAP, as approved, in accordance with the approved schedule [A.A.C. R18-12-263.02(I)].

In order to follow the progress of the department approved remedial alternative, the corrective action status report should be accompanied, as applicable to the technologies employed, by information, data and conclusions on:

- remedial system function and operational performance;
- monitoring/sampling results;
- copies of agreements, permits or covenants procured;
- an analysis of system performance relative to that predicted or expected in the CAP;
- deviations or problems incurred during start-up/shake down or O&M;
- deviations, adjustments or additions to the engineering design, operation, or monitoring/sampling plan; and
- changes relative to the CAP implementation schedule.

7.6 CORRECTIVE ACTION PLAN TERMINATION

The department may terminate an implemented CAP if the corrective action standards of the approved CAP are not being achieved. The department will provide notice to the owner or operator and to the public if termination of the CAP is being considered by the department [A.A.C. R18-12-263.02(J)].

7.7 REVISIONS TO AN APPROVED CORRECTIVE ACTION PLAN

The department may approve revisions to an approved CAP unless the revision involves a selection of alternative remediation methodologies, or may adversely affect the public directly impacted by the proposed corrective action activities [A.A.C. R18-12-263.02(K)]. The department will request a new CAP if the revision involves an alternative remediation methodology or may adversely affect public health or the environment [A.A.C. R18-12-263.02(L)].

7.8 VERIFICATION OF REMEDIATION

Compliance verification samples must be collected to demonstrate the effectiveness of remedial activities [A.A.C. R18-12-263.03(B)]. These samples differ from non-compliance samples collected during remediation (periodic sampling/reporting) as the time of sample collection occurs upon completion of remediation (confirmation sampling/reporting) and must meet the data quality objective requirements consistent with compliance sampling and analysis. The specifics of verification sampling are dependent upon the:

- impacted media (soil, groundwater, surface water),
- remediation method(s) used,
- type(s) of contaminant(s), and
- site-specific geology and hydrology.

Remediation verification sampling is critical to demonstrating that the corrective action standard for each chemical of concern has been met in all media subject to remediation. The remediation verification sampling and reporting should be consistent with the plan which was documented in the approved CAP. The results and interpretation of the remediation verification sampling and analyses should be presented within the context of the Corrective Action Completion Report.